Refine Search

Your wildcard search against 10000 terms has yielded the results below.
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The probable cause is use of unlimited truncation. Revise your search strategy to use limited truncation.
Search Results -

Terms	Documents
L43 and ((rail$ or successi$) with (beacons or transmitters))	3

Database:
US Pre-Grant Publication Full-Text Database
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US OCR Full-Text Database
EPO Abstracts Database
JPO Abstracts Database
Derwent World Patents Index
IBM Technical Disclosure Bulletins

Search: L45

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Search History

DATE: Tuesday, August 09, 2005 Printable Copy Create Case

Set Name side by side	Query	Hit Count	Set Name result set
	DB=PGPB,USPT,USOC; THES=ASSIGNEE; PLUR=YES; OP=OR		
L45	L43 and ((rail$ or successi$) with (beacons or transmitters))	3	L45
L44	L43 and (beacons or transmitters)	54	L44
L43	L42 and (path$ or route)	54	L43
L42	L41 and l28	72	L42
L41	L39 and ((voice$ or audio$ or sound$) with (beacon$ or transmit$))	513	L41
L40	L39 and l34	0	L40
L39	L38 or l37	2727	L39
L38	(virtual$ with (beacon$ or transmit$)) and (guid$ or navigat$) and @pd<=20020806	1705	L38
L37	(virtual$ with (beacon$ or transmit$)) and (guid$ or navigat$) and	2533	L37

@ad<=20020806

L36	L35 AND L28	0	L36
L35	L34 OR L32	129	L35

DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR

L34	(5437055 | 2861264 | 4797677 | 2692985 | 5119104 | 2605418 | 2490050 | 4276553 | 4161730 | 4188614 | 4628517 | 4665404 | 5216429 | 5552772 | 2411518 | 3702477 | 5818977 | 4523178 | 2278779 | 3852763 | 6049302 | 2547066 | 3949400 | 3795896 | 4383242 | Re26680 | 4260982 | 6353406 | 3290685 | 5917449 | 3900877 | 3434142 | 5056106 | 3440635 | 4177466 | 3242494 | 3789409 | 5608712 | 5495499 | 6121926 | 5828693 | 3852750 | 6127976 | 3703714 | 4445118 | 4359733 | 4114155 | 6150921 | 4894662 | 4012728 | 3906204 | 3798648 | 3063048 | 3786413 | 5422908 | 3941984 | 3361970 | 3893069 | 5517406)![PN]	155	L34
L33	('5745075'| '2726039'| '6556942'| '4106023'| '4819053')[PN]	15	L33
L32	('2726039'| '5745075'| '2726039'| '6556942'| '4106023'| '4819053')[URPN]	55	L32
L31	L30 and (voice$ or audio or sound$)	2	L31
L30	L29 and position$	5	L30
L29	L28 and l15	6	L29
L28	(virtual$ with transmitter) and (guid$ or navigat$)	390	L28
L27	L26 and ((virtual$ or imagin$) same beacon$)	0	L27
L26	L24 and (audio$ same beacon$)	4	L26
L25	L24 and (audio$ with beacon$)	0	L25
L24	L23 or L21	46	L24
L23	(5389935 | 5742666 | 5555286 | 3176229 | 5367306 | 4888595 | 6052052 | 5974031 | 5024447 | 4394777 | 5914675 | 4630289 | 5515061 | 5563612 | 5731785 | 5157405 | 5515419 | 5742233 | 3613085 | 3790948 | 5726663)![PN]	44	L23
L22	('6275164'| '20040030491'| '2107155')[PN]	11	L22
L21	('6275164'| '20040030491'| '2107155')[URPN]	2	L21
L20	L19 and (audio$ with beacon$)	4	L20
L19	L9 or L15 or L10	145	L19

DB=PGPB,USPT; THES=ASSIGNEE; PLUR=YES; OP=OR

L18	L17 and gps	1	L18

DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR

L17	L16 and (audio$ with beacon$)	2	L17
L16	L15 and path$ and guid$	19	L16
L15	virtual$ with beacon$	144	L15

DB=PGPB,USPT,USOC; THES=ASSIGNEE; PLUR=YES; OP=OR

L14	L10 and (ship or aircraft or airplane) and audio$	1	L14
L13	L11 and (audio$ with beacon$)	0	L13
L12	L11 and (audio with beacon$)	0	L12
L11	L10 and (ship or aircraft or airplane)	11	L11
L10	virtual$ near3 beacon$	34	L10

DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR

L9 (audio adj beacon) same (ship or aircraft or airplane) 1 L9

DB=PGPB,USPT; THES=ASSIGNEE; PLUR=YES; OP=OR

L8 20020174021 1 L8

DB=PGPB; THES=ASSIGNEE; PLUR=YES; OP=OR

L7 20020165731 1 L7

DB=USPT; THES=ASSIGNEE; PLUR=YES; OP=OR

L6 L5 and navigat$ and locat$ 0 L6

L5 6539393.pn. 1 L5

DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; THES=ASSIGNEE; PLUR=YES; OP=OR

L4 (audio adj beacon) same (ship or aircraft or airplane) 1 L4

DB=USPT; THES=ASSIGNEE; PLUR=YES; OP=OR

L3 L2 AND (PROXIM$ WITH SENS$) 1 L3

L2 6314406.PN. 1 L2

L1 6865547.pn. 1 L1

END OF SEARCH HISTORY

Hit List

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Search Results - Record(s) 1 through 3 of 3 returned.

☐ 1. Document ID: US 20020037716 A1

Using default format because multiple data bases are involved.

L45: Entry 1 of 3 File: PGPB Mar 28, 2002

PGPUB-DOCUMENT-NUMBER: 20020037716
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020037716 A1

TITLE: Communique system for virtual private narrowcasts in cellular communication networks

PUBLICATION-DATE: March 28, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	COUNTRY	RULE-47
McKenna, Daniel B.	Steamboat Springs	CO	US	
Graziano, James M.	Platteville	CO	US	

US-CL-CURRENT: 455/426.1; 455/517

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw D

☐ 2. Document ID: US 6741856 B2

L45: Entry 2 of 3 File: USPT May 25, 2004

US-PAT-NO: 6741856
DOCUMENT-IDENTIFIER: US 6741856 B2

TITLE: Communique system for virtual private narrowcasts in cellular communication networks

Full | Title | Citation | Front | Review | Classification | Date | Reference | Claims | KWIC | Draw D

☐ 3. Document ID: US 4106023 A

L45: Entry 3 of 3 File: USPT Aug 8, 1978

US-PAT-NO: 4106023
DOCUMENT-IDENTIFIER: US 4106023 A

TITLE: Navigation aid system

Terms	Documents
L43 and ((rail$ or successi$) with (beacons or transmitters))	3

L45: Entry 1 of 3 File: PGPB Mar 28, 2002

PGPUB-DOCUMENT-NUMBER: 20020037716
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020037716 A1

TITLE: Communique system for virtual private narrowcasts in cellular communication networks

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McKenna, Daniel B.	Steamboat Springs	CO	US	
Graziano, James M.	Platteville	CO	US	

ASSIGNEE-INFORMATION:

NAME	CITY	STATE	COUNTRY	TYPE CODE
Vesuvius, Inc.				02

APPL-NO: 09/ 853142 [PALM]
DATE FILED: May 9, 2001

RELATED-US-APPL-DATA:
Application 09/853142 is a continuation-in-part-of US application 09/638744, filed August 14, 2000, PENDING

INT-CL: [07] H04 Q 7/20

US-CL-PUBLISHED: 455/422; 455/414, 455/435, 455/517
US-CL-CURRENT: 455/426.1; 455/517

REPRESENTATIVE-FIGURES: 1

ABSTRACT:

The communiqu system for private virtual narrowcasts operates with existing cellular communication networks to provide private virtual narrowcast communication services, that are initiated by a narrowcast host, to subscribers. The Communiqu can be unidirectional (broadcast) or bi-directional (interactive) in nature and the extent of the Communiqu is narrowcast, where cells and/or cell sectors are grouped to cover a predetermined geographic area or demographic population or subscriber interest group to transmit information to a private group of subscribers who populate the target audience for the narrowcast transmissions. The grouping of cells to form the communiqu coverage area for the narrowcast transmissions need not be contiguous and can comprise dynamic combinations of contiguous and non-contiguous cells as well as combinations of in-building wireless coverage areas, standard terrestrial cells, non-terrestrial cells, orchestrated in a hierarchical

manner. The private virtual narrowcasts use the code, frequency and time domains to enable multiple users to share the same wireless resource in a manner that, from the users perspective, has dedicated spectrum or channel capacity to their particular application. The applications can include asymmetric bi-directional communications where private virtual narrowcasts stimulate the generation of point-to-point responses from subscriber terminal devices.

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation-in-part of U.S. patent application Ser. No. 09/638,744, titled "Communiqu System for Cellular Communication Networks" and filed on Aug. 14, 2000.

Previous Doc Next Doc Go to Doc#

L45: Entry 1 of 3 File: PGPB Mar 28, 2002

DOCUMENT-IDENTIFIER: US 20020037716 A1
TITLE: Communique system for virtual private narrowcasts in cellular communication networks

Pre-Grant Publication Date:
20020328

Application Filing Date:
20010509

Detail Description Paragraph:
[0032] Each cell in the cellular communication network comprises a predetermined volume of space radially arranged around the cell site transmitting antenna with the region of space roughly approximating a cylindrical volume having predetermined height. Since all of the wireless subscriber devices are installed in ground-based units (such as motor vehicles or handheld units) in traditional cellular communication systems, the antenna radiation pattern of the cell site is aligned to be proximate to the ground and the polarization of the signals produced by the cell site antenna is vertical in nature. In order to prevent the radio signals in one cell site from interfering with radio signals in an adjacent cell site, the transmitter frequencies for adjacent cell sites are selected to be different so that there is sufficient frequency separation between adjacent transmitter frequencies to avoid overlapping transmissions among adjacent cell sites. In order to reuse the same frequencies, the cellular telecommunication industry has developed a small but finite number of transmitter frequencies and a cell site allocation pattern that ensures that two adjacent cell sites do not operate on the same frequency. When a ground-based wireless subscriber device initiates a call connection, control signals from the local cell site transmitter cause the frequency agile transponder in the ground-based wireless subscriber device to operate at the frequency of operation designated for that particular cell site. As the ground-based wireless subscriber device moves from one cell site to another, the call connection is handed off to the successive cell sites and the frequency agile transponder in the ground-based wireless subscriber device adjusts its frequency of operation to correspond to the frequency of operation of the transmitter located in the cell site in which the ground-based wireless subscriber device is presently operational.

Detail Description Paragraph:
[0033] There are numerous technologies that can be used to implement the cellular communication network and these include both digital and analog paradigms, with the digital apparatus representing the more recent of the two technologies. Furthermore, the frequency spectrum is allocated for different cellular communication systems, with the personal communication system (PCS) systems being located in the 1.9 GHz region of the spectrum while traditional cellular systems are located in the 800 MHZ region of the spectrum. The access methods used in cellular communication systems include Code Division Multiple Access (CDMA) that uses orthogonal codes to implement communication channels, Time Division Multiple Access (TDMA) which uses time division multiplexing of a frequency to implement communication channels and Frequency Division Multiple Access (FDMA) which uses separate frequencies to implement communication channels, as well as combinations

of these technologies. There is also a HDR (High Data Rate) service, also called 1xEV or 1xEV-DO (1x Evolution-Data Only), which comprises a 2.4 Mbps communication architecture. This service uses a CDMA carrier but acts like TDMA from the user's perspective, with TCP/IP as the application layer protocol. The HDR service is one-one in format and bi-directional in communication mode. On the forward path, base to mobile, the HDR service only communicates with any one end-user at any given time, allocating the entire 2.4 Mbps bandwidth to that end user. It then bursts the next forward path transmission to the next end-user. The reverse path is contention based. This architecture takes advantage of the group traffic profile of multiple users who are surfing the web wirelessly. These concepts are well known in the field of cellular communications and various ones of these can be used to implement the ubiquitous wireless subscriber device of the present invention. These technologies are not limitations to the system which is described herein, since a novel system concept is disclosed, not a specific technologically limited implementation of an existing system concept.

Detail Description Paragraph:
[0056] Existing broadband cable television networks 170 comprise a multi-layer network which are used to distribute program materials, such as video, from program sources that are connected to a head end 171, through the various layers of the multi-layer network to the end user locations. A typical multi-layer network comprises a multiplicity of layers (typically two) interposed between the head-end 171 and the distribution nodes 191-192 that serve a plurality of end user locations. The original broadband cable television networks were engineered to provide a one-way distribution of video program material to the end user locations, therefore 95% of the available data transmission bandwidth in these broadband cable television networks are dedicated to transmissions from the head-end to the end user locations. The upstream path of the broadband cable television network is therefore a critical resource that limits the number of end user locations that can be served by a distribution node and also limits the number and nature of new interactive services that can be offered to the end user locations. Therefore, existing service offerings are limited to those that place a minimal demand on the upstream communication capabilities of the broadband cable television network. In addition, service providers have limited the number of end user locations that can be served by each passive fiber node in the broadband cable television network to enable the upstream channel to serve these end user locations. Therefore, the bandwidth limitation of the upstream channel in the broadband cable television network represents a service offering limitation and an inefficiency in terms of the number of end user locations that can be served.

Detail Description Paragraph:
[0061] The particular technology used to implement the communications between wireless subscriber devices and the radio frequency transmitter-receiver pairs and between the head-end and the wired subscriber devices as well as the nature of the data transferred there between, be it voice, video, telemetry, computer data, and the like, are not limitations to the communiqu system for private virtual narrowcasts 100 which is described herein, since a novel system concept is disclosed, not a specific technologically limited implementation of an existing system concept. Therefore, the term "cellular" as it is used herein denotes a communication system which operates on the basis of dividing space into a plurality of volumetric sections or cells, and managing communications between wireless subscriber devices located in the cells and the associated radio frequency transmitter-receiver pairs located at the cell site for each of these cells. In addition, the term "telecommunications cell" is used in the general sense and includes a traditional cell generated by a cell site as well as a sector of a cell, as well as a cell elevation sector, regardless of size and shape.

Detail Description Paragraph:
[0067] The basic functionality of the communiqu system for private virtual narrowcasts 100 comprises an information distribution management functionality that

concurrently propagates information to a plurality of wireless subscriber devices, using push, pull and combinations of push/pull data propagation modes. The need for information dissemination is identified: in response to external events, in response to predetermined temporal/spatial stimuli; as a function of subscriber inquiries/requests; and the like. The communiqu system for private virtual narrowcasts 100, in response to an identified information dissemination event, identifies a plurality of cells in the cellular communication network as well as available communication channels in each of these cells to carry the information that is to be transmitted to a plurality of wireless subscriber devices extant in the locales served by the selected cells, as well as communication channels and sites served by the wireline communication network. The communication channels can be dedicated to communiqu services or can be selected from the pool of available communication channels. The subscribers access the Communiqus by selecting the communication channel on their wireless subscriber device or wireline subscriber device that carries the Communiqu. The subscriber can be alerted to the presence of the Communiqu in many ways or can activate their wireless subscriber device or wireline subscriber device to retrieve the Communiqu absent any alert being transmitted to the wireless subscriber device or wireline subscriber device. The Communiqu retrieved by the subscriber is not subscriber-unique, in that the Communiqu is transmitted to many subscribers, with a plurality of subscribers concurrently accessing the Communiqu being a typical mode of operation. In addition, the bandwidth required for communiqu services can be variable, with unused channels of the existing cellular communication network being allocated on an as needed basis to communiqu services. Furthermore, the routine point to point cellular communication traffic can be load balanced with the communiqu services, with routine cellular traffic being preferentially served by cells that have unused capacity to thereby free up channels in other cells for communiqu services. In addition, the communiqu system for private virtual narrowcasts 100 identifies the appropriate source of information available from a program source that is to be used to constitute the communiqu service. The information can be a predetermined continuous feed, or can be comprised of a plurality of segments that can be interspersed with advertisements, other information segments and the like.

Detail Description Paragraph:
[0086] The communiqu wireless subscriber device MS is equipped with transmitter TRANS and receiver RCV circuits well known in cellular communications for providing voice and data communications via a voice data switch VDS. The apparatus also includes antenna VPA, which is typically mounted on an exterior surface of the communiqu wireless subscriber device MS and coupled in well known fashion to the transmitter TRANS and receiver RCV circuits by a duplexor. The power output of the transmitter TRANS can also be dynamically regulated as a function of the distance from the cell site transmitter antenna to ensure a relatively constant signal level, using the Power Control circuit presently available in many cellular radio systems.

Detail Description Paragraph:
[0096] An example of this is the connection of another terminal device, such as personal computer HT equipped with a modem, to the communiqu wireless subscriber device MS to thereby enable the user to transmit and receive data over the cellular voice communication connection, as is well known. The data can include facsimile transmissions, E-Mail, data files and the like. Additionally, the terminal device HT can include a video display and the data displayed thereon can be entertainment or informational programs that are uploaded from the cell site or a source connected to the communiqu wireless subscriber device MS via a cellular communication connection.

Detail Description Paragraph:
[0120] FIG. 4 illustrates in block diagram form a typical assignment of cells in a cellular communication network for a unidirectional transmission without subscriber registration mode of operation of the communiqu system for private virtual

narrowcasts 100, where a plurality of cells are transmitting Communiqu signals, with each cell using the same frequency and the same Walsh (PN) code for a selected Communiqu. There is a K=3 cell repeat pattern, although alternatively, the cells can be subdivided into three sectors for the same effect. In this manner, the communiqu wireless subscriber device MS does not have to search for the desired Communiqu, since the location is uniform throughout the cellular communication network. The communiqu wireless subscriber device MS is always in soft handoff mode and in the example of FIG. 4, the PN code varies by cell according to the K=3 repeat pattern, so the communiqu wireless subscriber device MS maintains a soft handoff mode with the three PN codes, regardless of the location of the communiqu wireless subscriber device MS in the cellular communication network. Existing wireless subscriber devices are equipped with three receivers in the rake receiver system that enables operation in this mode.

Detail Description Paragraph:
[0143] FIG. 7 illustrates in block diagram form a typical assignment of cells in a cellular communication network for a non-interactive bi-directional transmission with subscriber registration mode of operation of the communiqu system for private virtual narrowcasts 100, where a plurality of cells are transmitting Communiqu signals, with each cell using any frequency and any Walsh (PN) code for a selected Communiqu. This mode of operation enables the cellular communication system to select any repeat pattern of cells, any assignment of Walsh codes for a transmission to thereby enable communiqu services. The communiqu wireless subscriber device MS communicates with the Base Station Subsystem 131 for channel assignment spoofed registration purposes to receive free communiqu services. Thus, the communiqu wireless subscriber device MS does not require a unique MIN for this free communiqu services mode of operation, since billing or authorization is not required. This mode of operation can also be described as a receive-only mode of content delivery, with a bi-directional communication channel administration capability.

Detail Description Paragraph:
[0146] In this scenario, the issue of "push/pull" transmissions was not mentioned. The subscriber at communiqu wireless subscriber device MS can receive "push" data transmissions from a source which are directed to all subscribers of this service by the base station flood paging the MIN associated with this Communiqu. Thus, the communiqu wireless subscriber device MS would potentially have multiple MINs, with one for point to point traditional cellular communications and one for each of the communiqu services to which the subscriber enrolls. Alternatively, the communiqu wireless subscriber device MS can have a single MIN that includes a Communiqu address embedded in the application layer of the application software of the communiqu wireless subscriber device MS that filters the content received by the communiqu wireless subscriber device MS. This filter function distributes the Communiqu access control to the communiqu wireless subscriber device MS to thereby allow the subscriber to access only portions of the MIN enabled received content. Thus, when the communiqu wireless subscriber device MS is active in the service area, the flood page of one of the subscriber's MINs on the paging channel alerts the subscriber of the presence of a Communiqu transmission. The subscriber can activate communiqu wireless subscriber device MS to receive this transmission or can reject the transmission by operating appropriate buttons on the communiqu wireless subscriber device MS. The reverse path on this communiqu channel is disabled, since there are many subscribers simultaneously registering for the Communiqu.

Detail Description Paragraph:
[0147] The Mobile Telephone Switching Office 106, Base Station Controller (BSC) 132, 142, 152 and Base Station Transceiver (BST) 133, 143, 144, 153 need appropriate software and control revisions to not alarm or error when no reverse path transmission on the traffic channel is received from the communiqu device (mobile or fixed). For the provision of subscription or toll services via the non-

interactive bi-directional transmission with subscriber registration mode of operation of the communiqu system for private virtual narrowcasts 100, a plurality of cells transmit Communiqu signals, with each cell using any frequency and any Walsh (PN) code for a selected Communiqu. This mode of operation enables the cellular communication system to select any repeat pattern of cells, any assignment of Walsh codes for a transmission to thereby enable not only free communiqu services but also subscription services. The communiqu wireless subscriber device MS communicates with the base station 102 for registration purposes, but does not enter an interactive mode once registration is accomplished. Thus, the communiqu wireless subscriber device MS does not require a unique MIN for this mode of operation, since the subscription billing and authorization can be implemented using the ESN and/or SSD of the communiqu wireless subscriber device MS or other such unique identifier.

Detail Description Paragraph:
[0166] 8. Disable reverse path traffic channel on communiqu wireless subscriber device and error/loss measurement of carrier software at BTS/BSC. The reverse path traffic channel is disabled because the system is incapable of supporting of very large numbers of simultaneously transmitting communiqu wireless subscriber devices on one reverse traffic channel.

Detail Description Paragraph:
[0169] In essence, this communiqu wireless subscriber device MS is a fully functional cellular phone capable of receiving one-way communiqus in a blind radio like fashion (not transmit capable). It is also capable of receiving one-way communiqus with bi-directional administrative overhead capability for registration and channel assignment. And the final functionality is reverse path (mobile to base) communiqu capability. This reverse path communiqu capability can be implemented in a packet or circuit switched manner and can be coordinated or uncoordinated with respect to the one-way communiqu being transmitted from the base station. In practice, the preferred method is to architect this channel in a packet switched mode enabling multiple end-users access on a demand basis using a variety of protocols such as aloha or slotted aloha. While it is possible to have the reverse communiqu channel be circuit switched, this architecture is not designed for thin route types of data transfer from large numbers of end-users.

Detail Description Paragraph:
[0170] In summary, the "Transmit/Receive, Two-way Admin Overhead" communiqu wireless subscriber device MS is a full function device capable of three modes of operation with the highest functionality being the mode wherein the device is capable of reverse path communiqus. The reverse path communiqu can have the same registered subscribers as the coincident forward path communiqu or the reverse path communiqu could have a unique narrowcast group. The communiqu group for reverse path (mobile to base) communiqus does not have to coincide with the communiqu assignments on the forward path (base-to-mobile). Of importance, each communiqu wireless subscriber device MS now becomes a content source in a peer-to-peer architecture where each communiqu wireless subscriber device has the ability to send information to other users in its reverse path communiqu group.

Detail Description Paragraph:
[0185] The communiqu wired subscriber device WS is equipped with transmitter TRANS and receiver RCV circuits well known in cable television communications for providing voice and data communications via a voice data switch VDS. The communiqu wired subscriber device WS includes a user interface NTR that is equipped with the apparatus necessary to enable the user to receive and input data. For example, the user interface NTR includes a display device VD that produces a human sensible visualization of the data that is received and audio output device LS to produce a human sensible audio output of the received data. The user interface can also include audio input devices MIC and keyboard K (and/or mouse or pointer device) to enable the user to input data in an audible or textual form, respectively. The user

interface NTR can optionally include a biometric interface BM that measures an immutable physical characteristic of the user, such as a fingerprint, retina scan, and the like, to enable the communiqu wired subscriber device WS to authenticate the identity of the user. In addition, the communiqu wired subscriber device WS can include sensors, or an interface SENI that is adapted to connect to one or more sensors SM1, SM2, to measure selected parameters, such as ambient temperature, velocity, altitude, and the like.

Detail Description Paragraph:
[0195] The communiqu system for combined cellular and wireline communication networks 100 also includes a local mass storage memory 119 for storing control instructions for use by processor 118 as well as program material received from the various program sources identified above. A processor complex that includes Spatial-Temporal Content Manager 114 to manage the definition of the cells to which a particular Communiqu is transmitted controls the communiqu system for private virtual narrowcasts 100. Furthermore, the communiqu system for private virtual narrowcasts 100 includes Program Manager 113 to integrate information received from the various program sources into Communiqus that are transmitted over selected Traffic channels of the forward CDMA channel within one or more cells as identified by the Spatial-Temporal Content Manager 114. The Communiqus generated by the Program Manager 113 are transmitted to the various Base Station Subsystems 131-151 identified by the Spatial-Temporal Content Manager 114 either directly or via the associated Mobile Telephone Switching Office 106. The Program Manager 113 functions to assemble program streams as described below and transmits the program streams containing the Communiqus via a selected communication medium, such as the Public Switched Telephone Network 108, using network interface 116A, or some other communication medium, such as an IP network.

Detail Description Paragraph:
[0197] An alternative to the use of centralized, predetermined Communiqus that are formatted at the communiqu system for private virtual narrowcasts 100 and transmitted via the Base Station Subsystems 132,142, 152 to the wireless subscriber devices, the delivery of information can be effected by using the content domain as a distribution format. The content domain enables the communiqu system for private virtual narrowcasts 100 to achieve a dynamic, changeable broadcast/narrowcast without modifying or reconfiguring the RF network domain.

Detail Description Paragraph:
[0216] FIG. 8 illustrates in block diagram form a typical signaling protocol for use in the communiqu system for private virtual narrowcasts 100. A frame 800 can be used to transmit both content as well as control information and a broadcast guide. The frame 800 is shown in one typical form, although the particulars of the frame 800 can vary as a function of the use of this element. In particular as noted above, a broadband program stream containing all information for all cells can be created by the Spatial-Temporal Content Manager 114. This information is delivered to the Mobile Telephone Switching Office 106 via a communication medium, such as the Public Switched Telephone Network 108, for distribution to all relevant Base Station Subsystems 132, 142, 152. The Base Station Subsystems 132, 142, 152 can either parse the information contained in the frame into a plurality of Communiqus for transmission in their cells, such as the plurality of cells included in coverage areas A-C shown on FIG. 12. Alternatively, the information can be passed directly to the wireless subscriber devices for parsing therein. Yet another alternative is the hierarchical parsing of the information, where the Base Station Subsystems 132, 142, 152 parse the received information frame into a plurality of subframes of similar format and reduced content for transmission to the wireless subscriber devices for further parsing of the subframes into the individual Communiqus.

Detail Description Paragraph:
[0217] The frame 800 has a plurality of constituent parts, including a Header 801,

Administration 802, Data 803 and Trailer 804. The Header 801 and Trailer 804 are used to identify the beginning and end of the Frame 800 and can include error check bits to ensure proper transmission of the data. The Administration 802 is used to convey various control information to the Base Station Subsystem and to the wireless subscriber device. The Administration 802 can include a Radio Frequency Configuration segment 811, which defines the Traffic channel on which the frame is to be broadcast. The remaining segments of the Administration 802 consist of a "Program Guide" 812 which includes a schedule segment 821 to define the time at which the frame is to be transmitted and the information parsing data, content definition segment 822 the defines the content of the data section 803 of the frame 800 (and optionally the information parsing data), Authorization segment 823 which defines the type of service associated with the content of the data section 803 of the frame 800. Advertisements 824 can also be included in the Program Guide 812, along with optional special services 825, such as traffic reports 841, public service announcements 842 and the like 843. Other segments 826 can optionally be included. In the content segment 822, the content definitions describe the information that is available, and a plurality of such elements is shown to illustrate this concept, including but not limited to: music 831, 832, sports 833 and other programs 834.

Detail Description Paragraph:
[0219] The dynamic adaptation of the narrowcast coverage areas and the selection of information transmitted to subscribers located in these narrowcast coverage areas is accomplished by the communiqu system for private virtual narrowcasts 100, operating in cooperation with the Mobile Telephone Switching Office 106. The Program Manager 113 and the Spatial-Temporal Communiqu Manager 114 operate to determine: the presence of subscribers in a particular cell, the presence of external events, the movement of the subscribers from cell to cell, the available programs that are to be transmitted to the subscribers, and then process this information to create the Communiqus and the narrowcast coverage areas. This is accomplished in part by the communication between the communiqu system for private virtual narrowcasts 100, operating in cooperation with the Mobile Telephone Switching Office 106 in which the above-noted information is exchanged. In addition, the communiqu system for private virtual narrowcasts 100 maintains data in memory 119 that defines the call coverage area of the cells so that the external events can be mapped to locales and their associated serving cells.

Detail Description Paragraph:
[0254] The narrowcast wireless interface 1613, 1623 consists of a narrowcast wireless communication device MS that has optionally been modified to interface with the network 1611, 1621 of the telephone switching system 1610,1620. The narrowcast wireless interface 1613, 1623 is equipped with a processor CONTROL that operates pursuant to instructions that are stored in MEMORY and the subscriber profile information stored in profile memory PS, as is described below. The narrowcast wireless interface 1613,1623 is equipped with transmitter TRANS and receiver RCV circuits well known in cellular communications for providing voice and data communications via a voice data switch VDS. The apparatus also includes antenna VPA, which is typically mounted on an exterior surface of the narrowcast wireless interface 1613,1623 and coupled in well-known fashion to the transmitter TRANS and receiver RCV circuits by a duplexer. The power output of the transmitter TRANS can also be dynamically regulated as a function of the distance from the cell site transmitter antenna to ensure a relatively constant signal level, using the Power Control circuit presently available in many cellular radio systems.

Detail Description Paragraph:
[0257] To illustrate the operation of this system, the example of a virtual private network narrowcast that interconnects two telephone switching systems and a plurality of individual subscribers is used herein. In operation, the narrowcast source consists, for example, of an individual (narrowcast host) served, for example, by individual narrowcast wireless communication device 1631-5 who

initiates a virtual private network narrowcast by initiating a communication connection to the communiqu system for private virtual narrowcasts 100 and dialing either a predetermined code that identifies the predetermined set of participants in the virtual private network, or dials the telephone number of one or more participants in the virtual private network. In the former case, the narrowcast host at step 1701 initiates a communication connection to an interface 116A to access the Program Manager 113, located in the communiqu system for private virtual narrowcasts 100 to enable entry of the virtual private network narrowcast identification data at step 1702 via this communication connection. This virtual private network narrowcast data defines not only the narrowcast host, but also the various participants in the virtual private network narrowcast, which data can be pre-stored in the database 119 for access by the Program Manager 113 or input by the narrowcast host via this communication connection. The virtual private network narrowcast data is used by the Spatial-Temporal Content Manager 114 at step 1703 to interconnect the narrowcast host with the various participants in the virtual private network narrowcast and to route the communiqu data therebetween. For example, at step 1704 the Spatial-Temporal Content Manager 114 either dials the access number of the telephone switching system 1610 or transmits a page to the narrowcast wireless interface 1613, then at step 1705 the Spatial-Temporal Content Manager 114 can add other participants to the narrowcast who are served by telephone switching system 1610 via operation of conference circuit 1612 of the telephone switching system 1610 in well known fashion. At step 1706, the Spatial-Temporal Content Manager 114 can optionally add other locations, such as telephone switching system 1620 and participants served by telephone switching system 1620 as described above with respect to step 1705. Steps 1704-1705 can be repeated to add a number of telephone switching systems to the narrowcast virtual private network, as identified by the list provided to the communiqu system for private virtual narrowcasts 100 by the narrowcast host. Additionally, at step 1707, individual participants served by individual narrowcast wireless communication devices 1631-1, 1631-4 can be added by the Spatial-Temporal Content Manager 114 either dialing the telephone number of these devices to initiate a page to these individual narrowcast wireless communication devices 1631-1, 1631-4 or by simply narrowcasting the private virtual network communiqu to the cells in which these individual narrowcast wireless communication devices 1631-1, 1631-4 are operational, to enable them to participate in the virtual private network narrowcast. (Alternatively, the above-described steps can be executed manually by the narrowcast host.) Once all of the participants have been interconnected in the above-noted manner, the communiqu system for private virtual narrowcasts 100 enables the exchange of data among the participants in this narrowcast virtual private network communiqu session.

Detail Description Paragraph:

[0266] FIG. 19 illustrates in flow diagram form the operation of the communiqu system for private virtual narrowcasts in executing the distributed application device control function, using the general architecture of FIG. 18, where each of the wireless subscriber devices 1801-1808 shown therein comprise a narrowcast wireless interface that is connected to a utility meter and/or load. The communiqu system for private virtual narrowcasts 100 implements a data retrieval operation, such as a utility meter reading function, by polling utility meters (the communiqu subscriber in this case), each of which is equipped with a narrowcast wireless interface as described above, on a group basis. The utility meter reading process (narrowcast host) can be activated at step 1901 at times when other system communication traffic is low to more efficiently use existing bandwidth. There are numerous protocols that can be implemented to simplify this process. For example, each utility meter can be provided with a meter reading MIN to enable this utility meter reading service, or utility meters can be grouped by location, with a plurality of utility meters in each coverage area sharing a one of a plurality of meter reading MINs. Each coverage area (cell) can serve a plurality of meter reading MINs, with each meter reading MIN being activated seriatim until all meter reading MINs have been polled. Within each coverage area, the communiqu system for private virtual narrowcasts 100 at step 1902 selects at least one of the plurality

of meter reading MINs and at step 1903 activates a private virtual network narrowcast by transmitting a utility meter page via a narrowcast communiqu, to activate the selected group of utility meters that have been assigned that meter reading MIN. There can be a plurality of concurrently transmitted pages, using a multiplexed communication channel (such as an RF carrier) with each narrowcast wireless interface monitoring the transmission for a page that matches their assigned MIN. In response to the received page, all narrowcast wireless interfaces in the coverage area at step 1904 compare the transmitted page with their assigned MIN. If the MIN matches the data contained in the page, the narrowcast wireless interface is activated and at step 1905 initiates a service request on the reverse path to the communiqu system for private virtual narrowcasts 100. The service request is received at step 1906 to enable the requesting narrowcast wireless interface to join the virtual private network consisting of the plurality of narrowcast wireless interfaces sharing the same MIN. Each narrowcast wireless interface at step 1907 retrieves utility meter data from either its memory or the associated utility meter and transmits the utility meter data at step 1908 to the communiqu system for private virtual narrowcasts 100 on the reverse path. Contention for the return path can be handled in a traditional bus contention mode, where the plurality of narrowcast wireless interfaces substantially concurrently bid for access to the return path and the communiqu system for private virtual narrowcasts arbitrates among these requests until they are served. Alternatively, each narrowcast wireless interface can be programmed to time shift their service request initiation in response to the utility meter reading page so that the service requests are temporally distributed to thereby reduce contention.

Detail Description Paragraph:
[0267] The communiqu system for private virtual narrowcasts 100 responds to a service request from a narrowcast wireless interface at step 1906 noted above by using the SSD and/or ESN of the narrowcast wireless interface to select that narrowcast wireless interface and activate the data transfer of the utility meter data to the communiqu system for private virtual narrowcasts 100. After each request has been served, at step 1909, the communiqu system for private virtual narrowcasts 100 determines whether additional service requests remain unserved. If so, processing returns to step 1906. When the plurality of narrowcast wireless interfaces for the selected MIN has been served, the communiqu system for private virtual narrowcasts 100 returns to step 1902 and transmits a page using another of the plurality of meter reading MINs. This process continues until the plurality of meter reading MINs have been served and the process exits.

Detail Description Paragraph:
[0270] The communiqu system for private virtual narrowcasts groups cells and/or cell sectors to cover a predetermined geographic area or demographic population or subscriber interest group to transmit information to subscribers who populate the target audience for the narrowcast transmissions. The grouping of cells to form the communiqu coverage area for the narrowcast transmissions can be hierarchical in nature and consist of combinations of in-building wireless coverage areas, standard terrestrial cells, non-terrestrial cells, wireline based communication networks, orchestrated in a hierarchical manner.

CLAIMS:

1. A communiqu system for providing communiqu virtual private network communication services to subscribers, equipped with wireless subscriber devices, via a cellular communication network that includes a plurality of cell sites, each of which provides a plurality of wireless communication channels in a cell that covers a predetermined volume of space around a cell site transmitting antenna, comprising: means, responsive to a narrowcast host initiating a virtual private network narrowcast, for selecting at least one of said plurality of cell sites to provide a virtual private network narrowcast communiqu communication service; means for interconnecting said narrowcast host and a plurality of wireless subscriber devices

participating in said virtual private network narrowcast via said selected at least one of said plurality of cell sites; and means for routing information, constituting said virtual private network narrowcast communiqu communication service, among said narrowcast host and a plurality of wireless subscriber devices participating in said virtual private network narrowcast via selected ones of said plurality of wireless communication channels in said selected at least one of said plurality of cell sites.

14. The communiqu system of claim 1 wherein said virtual private network narrowcast communiqu communication service comprises distributed device control, said means for interconnecting comprises: means for transmitting a page to a plurality of said wireless subscriber devices, each of which serves an associated application device.

18. The communiqu system of claim 1 wherein said virtual private network narrowcast communiqu communication service comprises application device control, said means for interconnecting comprises: means for transmitting a page to a plurality of said wireless subscriber devices, each of which serves an associated application device.

20. The communiqu system of claim 19 wherein said virtual private network narrowcast communiqu communication service comprises application device control, said means for routing information comprises: means for transmitting data to each of said at least one of said plurality of wireless subscriber devices in each of said concurrently activated subsets to control operation of an application device connected thereto.

21. A method of operating a communiqu system for providing communiqu virtual private network communication services to subscribers, equipped with wireless subscriber devices, via a cellular communication network that includes a plurality of cell sites, each of which provides a plurality of wireless communication channels in a cell that covers a predetermined volume of space around a cell site transmitting antenna, comprising the steps of: selecting, in response to a narrowcast host initiating a virtual private network narrowcast, at least one of said plurality of cell sites to provide a virtual private network narrowcast communiqu communication service; interconnecting said narrowcast host and a plurality of wireless subscriber devices participating in said virtual private network narrowcast via said selected at least one of said plurality of cell sites; and routing information, constituting said virtual private network narrowcast communiqu communication service, among said narrowcast host and a plurality of wireless subscriber devices participating in said virtual private network narrowcast via selected ones of said plurality of wireless communication channels in said selected at least one of said plurality of cell sites.

34. The method of operating a communiqu system of claim 21 wherein said virtual private network narrowcast communiqu communication service comprises application device data retrieval, said step of interconnecting comprises: transmitting a page to a plurality of said wireless subscriber devices, each of which serves an associated application device.

38. The method of operating a communiqu system of claim 21 wherein said virtual private network narrowcast communiqu communication service comprises application device control, said step of interconnecting comprises: transmitting a page to a plurality of said wireless subscriber devices, each of which serves an associated application device.

40. The method of operating a communiqu system of claim 39 wherein said virtual private network narrowcast communiqu communication service comprises application device control, said step of routing information comprises: transmitting data to each of said at least one of said plurality of wireless subscriber devices in each

of said concurrently activated subsets to control usage of an application device connected thereto.

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L49: Entry 1 of 2 File: USPT Oct 17, 2000

US-PAT-NO: 6133867
DOCUMENT-IDENTIFIER: US 6133867 A

TITLE: Integrated air traffic management and collision avoidance system

DATE-ISSUED: October 17, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
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APPL-NO: 09/ 221925 [PALM]
DATE FILED: December 28, 1998

PARENT-CASE:
This application claims benefit of Provisional application Ser. No. 60/070,311 filed Jan. 2, 1998.

INT-CL: [07] G01 S 13/93

US-CL-ISSUED: 342/29; 342/36, 342/30, 342/49, 342/125, 342/357.09, 342/357.1
US-CL-CURRENT: 342/29; 342/125, 342/30, 342/357.09, 342/357.1, 342/36, 342/49

FIELD-OF-SEARCH: 342/29, 342/30, 342/31, 342/32, 342/36, 342/40, 342/41, 342/46, 342/49, 342/115, 342/125, 342/135, 342/140, 342/357.09, 342/357.1

PRIOR-ART-DISCLOSED:

U.S. PATENT DOCUMENTS

Search Selected Search ALL Clear

	PAT-NO	ISSUE-DATE	PATENTEE-NAME	US-CL
☐	H1410	January 1995	Hartley	364/148
☐	5825326	October 1998	Semler et al.	342/357
☐	5838562	November 1998	Gudat et al.	364/424.02

ART-UNIT: 362

PRIMARY-EXAMINER: Sotomayor; John B.

ABSTRACT:

A collision avoidance system utilizes a satellite navigational system to continuously determine object motion parameters relative to the earth's surface and exchanges this information with other objects. The system calculates collision potential with other objects that are stationary or in motion based on the exchange of the motion parameters. Evasive actions are calculated with congested space and altitude floor taken into account. The system determines collision potential between two or more objects or can utilize a single ground monitor to perform the collision potential calculations between all participating objects.

19 Claims, 10 Drawing figures

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L49: Entry 1 of 2 File: USPT Oct 17, 2000

DOCUMENT-IDENTIFIER: US 6133867 A
TITLE: Integrated air traffic management and collision avoidance system

Abstract Text (1):
A collision avoidance system utilizes a satellite navigational system to continuously determine object motion parameters relative to the earth's surface and exchanges this information with other objects. The system calculates collision potential with other objects that are stationary or in motion based on the exchange of the motion parameters. Evasive actions are calculated with congested space and altitude floor taken into account. The system determines collision potential between two or more objects or can utilize a single ground monitor to perform the collision potential calculations between all participating objects.

Application Filing Date (1):
19981228

DATE ISSUED (1):
20001017

Detailed Description Text (50):
For minimum safe altitude coordinates (terrain avoidance), beacon stations will be distributed throughout the surface of the Earth which contain a transmitter and preprogrammed position data or optionally contain a GPS receiver to compare against preprogrammed position data and calculate a differential correction value (offset from true position). Minimum safe altitude transmitters contain a preprogrammed object ID (similar to the craft ID of stationary objects) which uniquely identify the transmission as coming from a minimum safe altitude transmitter station and the ID of the station. Minimum safe altitude transmitter stations transmit data less often than moving craft since the data virtually does not change. As an option, minimum safe altitude transmitter stations transmit a data packet containing position (that is, coefficients with velocity and acceleration equal to zero), ID, and position correction data (differential error correction data based on the difference between GPS calculated vs. true known position).

Detailed Description Text (156):
If the remote craft does not contain collision avoidance processing but contains beacon, command transfer, and audio/visual announce capability, the local craft performs evasive calculations for both craft and then transmits evasive instructions to the remote craft (3330). The remote craft receives the instructions (3030), and announces or displays the instructions (3080).

CLAIMS:

14. A method for preventing a collision between multiple participating objects in three dimensional space where there is a common referenced multi dimensional position determining system in operation, comprising:

position determining means in movable object for determining data parameters of position, velocity, acceleration, and time of said object;

CPU means in said object coupled to said position determining means for continuously storing said data parameters at time spaced intervals and calculating Nth order motion path coefficients in three dimensional axis for transmission in time spaced data packets and for storing object identification indicia and for storing object operating parameters and limitations;

digital transmission means coupled to said CPU means for transmitting said time spaced data packets containing the object identification indicia, the unique message type identification, the object Nth order path coefficients, and the time data in digital format to remote receiver means;

digital receiver means coupled to said CPU means for receiving and storing said time spaced data packets containing the identification indicia, the unique message type identification, Nth order three dimensional object path coefficients, and the time data in digital format from remote transmitter means in movable or stationary object;

said CPU means having programming instructions so as to be responsive to said data parameters for calculating collision potential between said aircraft and remote object using aircraft motion path data and data received from remote transmitter means;

Audio means coupled to said CPU means in said object for notification to object operator of collision potential and/or evasive maneuver instructions; and

operator input means coupled to said CPU for manual initiation of transmission of said data parameters including object identification indicia and unique message type identification.

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L29: Entry 4 of 6 File: USPT Apr 4, 1989

DOCUMENT-IDENTIFIER: US 4819053 A
TITLE: Single-point locating system

Abstract Text (1):
A locating system employs a single-point device employing unique scanning patterns for generating peak signal data which can be used to calculate the position of a signal source within a scanned region. One preferred embodiment utilizes a satellite in high earth geosynchronous orbit and a simultaneous yaw and roll pattern to scan a substantial portion of the earth's surface. The point source being located may be virtually any form of transmitter of radiant energy such as infrared, electromagnetic, light or acoustical energy. The scanning device may also be positioned in a low earth orbit satellite, an aircraft, a missile or a helicopter. The single-point device re-radiates the signal source transmission to a computer command center which correlates single-point device scanning position data with received transmissions to accurately compute the location of the signal source. Beacons placed at precisely known locations may be used to interpret scan data. The computer triangulates peak signals of multiple roll orbits generated during each yaw orbit of the single-point device to determine the precise location of the source. The computer may also search a data base to identify the signal source and provide related information previously stored in the data base. The invention is particularly advantageous for locating stolen vehicles and for finding kidnapped persons. The system may also be used for determining altitude of a signal source that may, for example, be located on an aircraft in flight.

Brief Summary Text (3):
The present invention relates generally to radiation-based two-dimensional and three-dimensional locating systems and more specifically, to a single-point locating system which in one preferred embodiment utilizes a satellite in geosynchronous orbit scanning a preselected region on the earth's surface in a simultaneous yaw and roll pattern for precisely locating a point source of energy. Such device can be used to find lost or stolen items or to provide position information for navigation systems. It can also be used to provide location information to trucking and shipping companies, taxicab companies, airlines, bus and train companies, construction companies, surveyors and the like. It can also be used to determine the exact present position of any person or thing on which a suitable transmitter is located. Thus, the present invention can help in finding lost or kidnapped children. It can be used as means for instant communication of auto accidents or road emergencies as well as portable security devices for travelers, hikers, joggers and the like. A passive receiver-calculator version can be used to determine precise local position based upon peak detection of satellite down-link scanned transmission. As used herein the "peak signal detection" includes other signal direction detection means.

Brief Summary Text (5):
The need for a reliable means for quickly and accurately locating the position of an object or person has long been recognized. In emergency situations such as shipwrecks, aircraft crashes or automobile accidents, the ability to quickly and accurately determine location is often a life and death matter. When a child is lost or has been kidnapped, fast and accurate location of his whereabouts is equally a life and death situation. Furthermore, for the elderly or infirm, the

means of instantly communicating their exact present location in the event of a medical or other emergency returns to them the freedom to travel and independence. To the dispatcher of a taxicab company, instant knowledge of the exact location of each cab in the fleet allows him the time and cost savings of directing the nearest taxicab in his fleet to respond to a call from a customer. Of course, such time and cost savings can be realized in analogous service industries such as high speed delivery services and the like. A reliable and accurate locating system when used on aircraft offers aircraft collision avoidance as well as superior navigational information allowing straight line flight to any destination thereby saving both time and fuel. Upon approach to an airport, aircraft can utilize the added accuracy of such a navigational capability to provide instrument landing systems at any airport rather than the limited number of airports now offering such capability. The same advantages can be used on ships for allowing lower cost and great flexibility in scheduling due to the time savings of straight line navigation over long distances. In military applications, the exact position of troops and vehicles can prove vital to the battlefield commander. The ebb and flow of the battle can be instantly seen in real time presentations of troop and armament locations. For diplomats in hazardous areas, a precise and portable location system offers a means of security in the event terrorist activity results in taking hostages. The chance for successful rescue is greatly improved by knowing the exact present location of the hostage. Such locating devices may also be advantageously used in security systems such as car alarms.

Brief Summary Text (34):
U.S. Pat. No. 3,852,750 to Klein is directed to a navigation satellite system. However it uses a plurality of synchronous satellite relays in order to determine the position of various earth bound vehicles. Three synchronous satellites are used alternatively to relay radio frequency carrier amplitude modulated signals with a multiplicity of low frequency tones. Each of the vehicles has a communication receiver including an amplitude modulated detector and a position location system. The amplitude modulated detected output of the communications receiver is coupled to the position location systems and determines the position of the vehicle from the relative phases of the low frequency tones.

Brief Summary Text (39):
U.S. Pat. No. 4,445,118 to Taylor et al is directed to a navigation system which utilizes a geostationary satellite in combination with a global positioning system comprising a plurality of satellites. The position coordinates of various vehicles and other sources on the earth's surface is provided by processing a plurality of signals transmitted by the multiplicity of orbiting satellites in the global positioning system. An acquisition aiding signal generated by a control station is relayed to the various user terminals through the geostationary satellite.

Brief Summary Text (47):
It will be seen hereinbelow that the present invention may be readily used for locating point targets in three-dimensions. As a result, the precise location and altitude may be determined using only a single satellite or other platform. Such capability should prove extremely advantageous for aircraft navigation and tracking. A precision three-dimensional locating capability may also find advantageous application in the automated tracking and control of aircraft for both civilian and military purposes.

Detailed Description Text (16):
The process for providing location data used by the ground station of the present invention is illustrated in flow diagram form in FIGS. 7 and 8. FIGS. 7 and 8 illustrate virtually identical processes except for the use of a beacon in FIG. 7 to generate the yaw and roll angle data as compared to the use of a "compass" to generate that information in the process of FIG. 8. Accordingly, only one of such flow diagrams need be described herein. Referring to FIG. 7 therefore, it will be seen that in response to the uplink signal received from the satellite from a

sending unit or earth station, the satellite reads and repeats the reading of the uplink signal twenty four times per minute assuming a twelve RPM roll rate. Each time the signal is read or re-read by the satellite it is transmitted or relayed down to the unitary earth station of the present invention where it is decoded for identification to determine what if any identifying information has been stored in the data base corresponding to the particular encoding of the sending unit, the signal of which has been received by the satellite.

Detailed Description Text (19):
There may be occasions when it is preferably to obviate the use of a command center or to preclude the need for an uplink transmitter at each locating position. A second embodiment of the invention makes these alternatives possible. More specifically, by providing a satellite-based transmitter which generates a signal carrying precise, real-time yaw and roll scanning data, a ground-based passive receiver can be used to calculate its own position. This can be accomplished by correlation of peak signal detection and yaw and roll data or multiple roll scans in substantially the same manner utilized in the command center of the first embodiment. The second embodiment is particularly advantageous to boaters and the like who may need to determine their precise location for navigation purposes. Although the ground-based system of the second embodiment need not have a transmitter, it will be preferably equipped with a calculator substantially equivalent for example to a Hewlet Packard Model 41C programmable calculator, for arriving at the precise location based on multiple correlations of the receiver. The calculator would carry out the algorithm of FIG. 8 with the decode and compass update steps eliminated.

Detailed Description Text (36):
Those having skill in the art to which the present invention pertains will now understand that there are virtually unlimited applications for the present invention. By way of example, the present invention may be readily used for navigational purposes for controlling the position and altitude of military and commercial aircraft in response to real time knowledge of their actual flight paths in either two or three dimensions. Furthermore, the embodiments of the present invention may have profound military applications by enabling the commander of a manned force or a ship force to have a real time representation of the precise location of each of his men or ships. The second embodiment provides this capability without requiring ground-based transmission. Furthermore, because the present invention is not limited to any particular type of radiant energy, it may also be used to detect and report the occurrence and location of an anomalous condition such as leaks in long pipe lines, or for example, forest fires where small fires can be detected early before they have had a chance to do more substantial damage.

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L29: Entry 5 of 6 File: USPT Aug 8, 1978

DOCUMENT-IDENTIFIER: US 4106023 A
TITLE: Navigation aid system

Brief Summary Text (1):
The present invention relates broadly to direction finding and position finding methods and apparatus and, in particular, to omni-directional radio navigation aid systems utilizing the well-known Doppler effect.

Brief Summary Text (2):
A number of beacon and navigation aid systems have been described in the patent literature.

Brief Summary Text (26):
The present invention provides a system that derives directional information, including both azimuth and elevation angle of the radial connecting the ground or reference station and a navigating craft, by frequency measurements. This system, called herein the Rectilinear DVOR, or RDVOR, employs either a radiator that is moved along a straight line, or a rectilinear arrangement of discrete antennas and the signal to be radiated is commutated among these antennas in prescribed successions to simulate rectilinear motion of the radiator. The resulting induced Doppler frequency shift is determined by the direction of the radial to the receiver relative to the orientation of the rectilinear motion of the radiator or of the rectilinear arrangement of commutated radiating antennas. Accordingly, the directional (azimuth and elevation angle) information can be measured precisely by a measurement of Doppler-induced self-referencing frequency changes.

Drawing Description Text (2):
FIG. 1 is a block diagram of one form of radio navigation system in accordance with this invention, including a beacon transmitter and one form of receiving and indicating scheme for deriving directional intelligence from the signals emitted by the transmitter;

Detailed Description Text (1):
Referring particularly to FIG. 1, a transmitter 5 supplies a carrier signal of the frequency f.sub.o to an omni-directional antenna 1 through slip rings 7. The antenna 1 is supported by a horizontal arm 2 and a vertical shaft 3. A motor 4 drives the shaft with a uniform velocity through a system of cams, roller bearings and guide rails thereby causing the antenna to move in a reciprocating back-and-forth manner along a straight line of length D, such as line E-W, of FIG. 3.

Detailed Description Text (85):
If more that one line of antennas is allowed, then each may be oriented to provide least sensitivity in a particular sector to reflections from a particular site feature. Since only one line is necessary for the bearing measurement, a navigator with full knowledge of the exact orientations of the rectilinear arrangements, and of the site characteristics, can base his measurements on the signal from the most favorable line.

Detailed Description Text (92):
A second unmodulated sinusoidal radio-frequency signal is commutated through the

orthogonal line of antennas 35 in the same manner as just described to produce a second FSM signal. This second signal is used in the bearing computation and serves to resolve ambiguity and correct errors due to elevation angle of the distant navigating observer relative to the plane of the ground antenna arrays 34 and 35. The addition of a time reference that identifies the direction of the source motion versus time provides the necessary information to measure bearing unambiguously from 0 through 360.degree.. Such a time reference may be conveniently added in a number of ways; e.g., by effectively stopping the signal source motion momentarily at one end of the linear array (which can, for example, be accomplished by commutating the end antenna by means of a Multiport Coupler 32 and 33 through several segments of the RF Distributors 29 and 30 as illustrated by FIG. 10), or by arranging the commutation connections so that the simulated source motion appears to slow down over a few elements to rest at the reference end elements, and so forth.

Detailed Description Text (109):
The Rectilinear DVOR receiver design described above for illustrating a practical implementation emphasizes the use of digital techniques and circuits to provide accuracy and stability unrealizable by analog methods. The all-digital signal processing design is amenable to economic production methods, such as LSI, and does not require painstaking calibration after manufacture. LSI implementation would decrease the size, weight, and power consumption to negligible levels, relative even to single-engine or light twin aircraft. Digital autopilot and automatic navigation system pickoffs could also be used without reqiring analog-to-digital conversion, since the signals would already be available in digital format. (Simple digital-to-analog converters could be provided for analog output signal requirements, such as meter displays, etc.)

Detailed Description Text (113):
As previously stated, one of the objects of this invention is to provide a convenient method for transmitting calibrating signals from the beacon transmitters in a radio navigation system. In a Rectilinear DVOR system, the calibration signal can be used to calibrate the measured frequency shifts relative to the direction of approach along the antenna line of motion. The transmission of a calibrating signal is also particularly useful whenever the radiated signal is changed from time-to-time to prevent unauthorized use of the transmissions or to provide a method for station and array identification. In those cases where a reference signal is produced locally within the receiver rather than transmitted, it is almost essential to accurate operation that calibrating information be transmitted.

Detailed Description Text (117):
Up to this point, we have described an invention in which the signal is radiated by an antenna that is made to execute a controlled motion back and forth along a straight line of some defined length or is commutated along a linear arrangement of stationary antennas, and the receiver is attached at a stationary position relative to some distance navigating craft. In a variation of this invention, which we label here the "Reverse Rectilinear DVOR" or the RRDVOR, the roles of transmitter and receiver are interchanged; that is to say, at least one receiving position is repetitively moved along a line of motion having a predetermined, fixed location in the frame of reference. The receiving position may be moved by moving a receiving antenna back and forth on the surface on which it is mounted, or such motion may be simulated by a process of commutation of the receiver input among plural antenna elements arranged along the line of motion, and the signal is radiated by an antenna mounted in a fixed position on the surface carrying it. In this variation on the present invention, the receiving antenna position relative to the surface carring it may be moved back and forth along a straight line, or it may be moved along an open or closed, rectilinear or curvilinear line of motion; alternatively, said motion may be simulated by commutation of the receiver input among antennas arranged along any of the aforesaid lines of motion.

Detailed Description Text (126):
(d) Each antenna line may be subdivided into sections to be traversed in various pre-determined sequences. Moreover, the beacon transmitters can, in general, be operated in connection with two or more spaced pairs of crossed lines so that a ship or aircraft equipped with a receiver can obtain a position "fix" by triangulation. It may sometimes be convenient to operate these transmitters in fairly rapid sequences on the same frequency. Moreover, since the directional information is implicit in the frequency deviation of a sinusoidal low-frequency signal obtained from the receiver, the design of automatic plotting or automatic position-computing apparatus for use with the navigation system described herein is greatly facilitated.

Detailed Description Text (130):
In yet another method, one may use a combination of motor-driven cams, which in turn drive a piston back and forth within a sleeve, in an adaptation of the well-known mechanical mechanism of reciprocating piston engines. The sleeve guides the motion of the piston in accordance with the desired line of motion of the antenna. The antenna is mounted on the moving piston, and protrudes through a rectilinear groove in the sleeve.

Detailed Description Text (133):
It is important to observe that in the architecture of a navigationaid or direction-finding system based on RDVOR or Reverse RDVOR principles, the only component subsystems that distinguish the RDVOR from the other types of electronic instrumentation (navigation aids, tracking, telemetry, command) systems, and hence may require specialized equipment are

Detailed Description Text (143):
In all cases, the only critical areas that may require special equipment design are those listed in the opening paragraph. Otherwise, and specifically, existing VHF or UHF communcation and telemetry transmitters and on-board antennas can be used directly as Reverse RDVOR beacon transmitters; existing VOR and other VHF and UHF telemetry receivers at least down to the IF prelimiter or post-limiter output are directly usable; and virtually all of the data processing and data communication hardward is off-the-shelf operational. Frequency sources of adequate stability are also off-the-shelf items, as are certain frequency counters which may well be applicable if the available flexibility of RDVOR design is suitably exercised.

Detailed Description Text (155):
Fourth, Rectilinear DVOR is cost-effective--from the viewpoint of both the ground station and navigation receiver.

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